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09/616,086	07/14/2000	Masaki Tamaru	32811	6585

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PEARNE & GORDON LLP  
526 SUPERIOR AVENUE EAST  
SUITE 1200  
CLEVELAND, OH 44114-1484

EXAMINER

VU, HUNG K

ART UNIT PAPER NUMBER

2811

DATE MAILED: 04/02/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/616,086

Applicant(s)

TAMARU ET AL.

Examiner

Hung K. Vu

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 28 December 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) 4, 5, 7-16 and 20-31 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3, 6 and 17-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

### Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☒ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Election/Restrictions*

1. Applicant's election without traverse of Embodiment 1 of Figures 1(a) – 3(c), claims 1-3, 6, 10, 12, and 17-19, in Paper No. 7 is acknowledged.

Claims 10 and 12, which depend on non-elected claims, and claims 4-5, 7-9, 11, 13-16, and 20-31 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected Invention, there being no allowable generic or linking claim. Election was made **without** traverse in Paper No. 7.

### *Drawings*

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the spatial intervals in the arrays of the first and second through-holes are smaller to those in the arrays of the first and second conductive layers, as recited in claim 18; or the spatial intervals in the arrays of the first and second through-holes are substantially equal to those in the arrays of the first and second conductive layers, as recited in claim 19, must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

***Specification***

3. The disclosure is objected to because of the following informalities:

On page 29, line 5, “squre” should be changed to “square” for clarity.

On page 40, line 9, page 43, lines 10 and 15, some characters are unknown.

On page 46, line 22, “though-holes” should be changed to “through-holes” for clarity.

Appropriate correction is required.

4. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

***Claim Rejections - 35 USC § 112***

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 18 – 19 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The specification does not disclose the spatial intervals in the arrays of the first and second through-holes are smaller to those in the arrays of the first and second conductive layers, as recited in claim 18; or the spatial intervals in the arrays of the first and second through-holes are substantially equal to those in the arrays of the first and second conductive layers, as recited in claim 19.

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6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 17 – 19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claims 17 – 19, lines 2 – 3, “said first and second through-holes” lacks of antecedent basis.

In claims 17 – 19, lines, 2 – 4, the phrase “said first and second conductive layers are filled in the first and second through-holes, and the upper ends thereof are connected to the first and second conductive layers” is unclear as to how the first and second conductive layers are filled in the first and second through-holes can have the upper ends which are connected to the first and second conductive layers.

### ***Claim Rejections - 35 USC § 102***

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 – 3, 6, and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by Takahashi et al. (PN 5,311,048). Note Figures 1 and 7 of Takahashi et al.. Takahashi et al. discloses a semiconductor device comprising,

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A first conductive layer (12) formed of a surface of a semiconductor substrate;

A second conductive layer (12) which is formed close to the first conductive layer,

wherein

The distance between adjacent conductive structures (the first conductive layer (12) and the second conductive layer (12)) is commonly determined by the permittivity of the insulating layer (10, 13) encapsulating the conductive structures. Please note that permittivity of the insulating layer controls the capacitance between adjacent conductive structures. Effective control of this capacitance is essential in achieving the optimum electrical characteristics of a semiconductor device. So this particular limitation is held inherent in that the distance between the adjacent conductive structures is determined by the permittivity of the insulating layer. In alternative, this limitation (the distance between the adjacent conductive structures being determined by the permittivity of the insulating layer) deals with how the claimed device is made. Therefore, the claimed device must be directed to the product per se, no matter how actually made.

With regard to claim 2, Takahashi et al. discloses the second conductive layer is made of a conductive film being filled in a through hole being located close to the first conductive layer and passing through at least a part of the insulating film; and the first and second conductive layers are connected to first and second potentials ( $V_{ss}$ ,  $V_{cc}$ ), respectively, and a capacitor, which extends in the depth direction of the through hole, is formed by using the insulating inter-layer film interposed between the first conductive layer and the second conductive layer within the through hole.

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With regard to claim 3, Takahashi et al. discloses the through hole comprises a second through hole being electrically connected to a semiconductor region or a wiring region only at either of the opened ends thereof.

With regard to claim 6, Takahashi et al. discloses the first conductive layer is formed within a first through-hole being separated by a predetermined distance from the through-hole, whereby a vertical capacitor, which extends in the depth direction of the through-hole, is formed by the first and second conductive layers (12,12) and the insulating film (10,13) interposed between the first and second conductive layers.

With regard to claim 17, Takahashi et al. discloses the first and second conductive layers are filled in the first and second through-holes, and the upper ends thereof are connected to the first and second conductive layers, and the spatial intervals in the arrays of the first and second conductive layers are smaller than those in the arrays of the first and second through-holes.

8. Claims 1 – 3, 6, and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by Nakanishi et al. (PN 4,954,877, of record). Note Figure 1B of Nakanishi et al..

Nakanishi et al. discloses a semiconductor device comprising,

A first conductive layer (15) formed of a surface of a semiconductor substrate;

A second conductive layer (15') which is formed close to the first conductive layer,

wherein

The distance between adjacent conductive structures (the first conductive layer (15) and the second conductive layer (15')) is commonly determined by the permittivity of the insulating layer (3) encapsulating the conductive structures. Please note that permittivity of the insulating layer controls the capacitance between adjacent conductive structures. Effective control of this capacitance is essential in achieving the optimum electrical characteristics of a semiconductor device. So this particular limitation is held inherent in that the distance between the adjacent conductive structures is determined by the permittivity of the insulating layer. In alternative, this limitation (the distance between the adjacent conductive structures being determined by the permittivity of the insulating layer) deals with how the claimed device is made. Therefore, the claimed device must be directed to the product per se, no matter how actually made.

With regard to claim 2, Nakanishi et al. discloses the second conductive layer is made of a conductive film being filled in a through hole being located close to the first conductive layer and passing through at least a part of the insulating film; and the first and second conductive layers are connected to first and second potentials (+,-), respectively, and a capacitor, which extends in the depth direction of the through hole, is formed by using the insulating inter-layer film interposed between the first conductive layer and the second conductive layer within the through hole.

With regard to claim 3, Nakanishi et al. discloses the through hole comprises a second through hole being electrically connected to a semiconductor region or a wiring region only at either of the opened ends thereof.



With regard to claim 6, Nakanishi et al. discloses the first conductive layer is formed within a first through-hole being separated by a predetermined distance from the through-hole, whereby a vertical capacitor, which extends in the depth direction of the through-hole, is formed by the first and second conductive layers (15,15') and the insulating film (3) interposed between the first and second conductive layers.

With regard to claim 17, Nakanishi et al. discloses the first and second conductive layers are filled in the first and second through-holes, and the upper ends thereof are connected to the first and second conductive layers, and the spatial intervals in the arrays of the first and second conductive layers are smaller than those in the arrays of the first and second through-holes.

9. Claims 1 – 3, 6, and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by Suzuki (PN 5,598,029, of record). Note Figure 4 of Suzuki.

Suzuki discloses a semiconductor device comprising,

A first conductive layer (7a) formed of a surface of a semiconductor substrate;

A second conductive layer (7b) which is formed close to the first conductive layer,

wherein

The distance between adjacent conductive structures (the first conductive layer (7a) and the second conductive layer (7b)) is commonly determined by the permittivity of the insulating layer (17b,16b) encapsulating the conductive structures. Please note that permittivity of the insulating layer controls the capacitance between adjacent conductive structures. Effective

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control of this capacitance is essential in achieving the optimum electrical characteristics of a semiconductor device. So this particular limitation is held inherent in that the distance between the adjacent conductive structures is determined by the permittivity of the insulating layer. In alternative, this limitation (the distance between the adjacent conductive structures being determined by the permittivity of the insulating layer) deals with how the claimed device is made. Therefore, the claimed device must be directed to the product per se, no matter how actually made.

With regard to claim 2, Suzuki discloses the second conductive layer is made of a conductive film being filled in a through hole being located close to the first conductive layer and passing through at least a part of the insulating film; and the first and second conductive layers are connected to first and second potentials, respectively, and a capacitor, which extends in the depth direction of the through hole, is formed by using the insulating inter-layer film interposed between the first conductive layer and the second conductive layer within the through hole.

With regard to claim 3, Suzuki discloses the through hole comprises a second through hole being electrically connected to a semiconductor region or a wiring region only at either of the opened ends thereof.

With regard to claim 6, Suzuki discloses the first conductive layer is formed within a first through-hole being separated by a predetermined distance from the through-hole, whereby a vertical capacitor, which extends in the depth direction of the through-hole, is formed by the first

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and second conductive layers (7a,7b) and the insulating film (17b,16b) interposed between the first and second conductive layers.

With regard to claim 17, Suzuki discloses the first and second conductive layers are filled in the first and second through-holes, and the upper ends thereof are connected to the first and second conductive layers, and the spatial intervals in the arrays of the first and second conductive layers are smaller than those in the arrays of the first and second through-holes.

***Claim Rejections - 35 USC § 103***

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takahashi et al. (PN 5,311,048).

Takahashi et al. discloses all of the claimed limitations except the spatial intervals in the arrays of the first and second through-holes are smaller or substantially equal to those in the arrays of the first and second conductive layers. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the spatial intervals in the arrays of the first and second through-holes of Takahashi et al. being smaller or substantially equal to those in the arrays of the first and second conductive layers, because it is conventional to adjust the

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spatial intervals of the first and second through-holes or of the first and second conductive layers in order to have the desire capacitance's value.

11. Claims 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakanishi et al. (PN 4,954,877, of record).

Nakanishi et al. discloses all of the claimed limitations except the spatial intervals in the arrays of the first and second through-holes are smaller or substantially equal to those in the arrays of the first and second conductive layers. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the spatial intervals in the arrays of the first and second through-holes of Nakanishi et al. being smaller or substantially equal to those in the arrays of the first and second conductive layers, because it is conventional to adjust the spatial intervals of the first and second through-holes or of the first and second conductive layers in order to have the desire capacitance's value.

12. Claims 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki (PN 5,598,029, of record).

Suzuki discloses all of the claimed limitations except the spatial intervals in the arrays of the first and second through-holes are smaller or substantially equal to those in the arrays of the first and second conductive layers. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the spatial intervals in the arrays of the first and second through-holes of Suzuki being smaller or substantially equal to those in the arrays of the first and second conductive layers, because it is conventional to adjust the spatial intervals of the

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first and second through-holes or of the first and second conductive layers in order to have the desire capacitance's value.

*Conclusion*

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hung K. Vu whose telephone number is (703) 308-4079. The examiner can normally be reached on Mon-Thurs 7:00-5:30, Eastern Time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (703) 308-2772. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Vu

March 19, 2002

  
TOM THOMAS  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800